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ABSTRACT

This document explores the various issues and concerns related to the development of online systems in libraries and, in particular, online catalogs. Following a preface, foreword, and introduction, chapters are devoted to each of the following topics: (1) providing for special interests including the disabled; (2) authority control; (3) subject access; (4) retrospective conversion; (5) resource sharing; (6) standards; and (7) education. The document is intended to help those who are involved in online catalog design, implementation, and use by making them more aware: (1) of the issues; (2) of the current activity related to them; and (3) of the consequences of that activity on the library profession, on the services provided to library users, and on the profession, on the services provided to library users, and on the library as an institution. A list of acronyms and a subject bibliography are included. (THC)

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ONLINE CATALOGS: ISSUES AND CONCERNS

by Jaye Bausser

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1984

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PREFACE

This is a book about some of the issues related to online catalogs and about some of the concerns that need to be addressed. There are numerous issues and concerns; those selected for inclusion reflect my own special interests developed during a three-year period of writing about online catalogs for the *RTSD Newsletter*. Each chapter addresses one of those issues or concerns.

Two of the chapters are review pieces. They cover the current state of and research in authority control and subject access with the aim of informing readers about important developments, trends, and needs in those areas.

The other chapters are reflective and meant to stimulate thoughtful planning, design, and implementation of online catalogs. Librarians and systems designers directly involved with online catalog development may find these discussions helpful, and so may librarians and administrators seeking information about online systems and their potential effect on the use of libraries, on library services, and on the profession as a whole.

Jaye Bausser
William R. Perkins Library
Duke University
November 7, 1984

FOREWORD

Ever since the Library of Congress closed its card catalog in 1981, libraries have been exploring the online public access catalog as a contemporary, technology-based alternative. Academic libraries have been the first to embrace this new way of locating information in the library. Computer technology has not only provided a useful substitute for the traditional card catalog, it has opened new possibilities for collection control, determination of status, and timely retrieval of information about holdings.

Jaye Bausser of the William R. Perkins Library at Duke University has been tracking developments in online public access catalogs since they first became viable library tools. She has been an authoritative voice on the subject through her columns in the *RTSD Newsletter*. For this ERIC publication she has brought together the relevant information on the topic and has added her touch of wisdom—a key element in designing online catalogs. The result is truly an information analysis product for librarians and information specialists. We are proud to offer it to the profession.

Donald P. Ely
Director
ERIC Clearinghouse on Information Resources
Syracuse University
November 16, 1984

INTRODUCTION

Status of Online Catalogs

Online catalogs are increasingly becoming a reality in librarianship. Many of us have eagerly awaited their development, hoping they would free us from burdens imposed by time-consuming maintenance of card catalogs and firmly convinced they would provide better service to library users. As online catalogs are made available to us for demonstrations, testing, and use, we see that our expectations can indeed be fulfilled. Users can be provided with more sophisticated retrieval of library information, and maintenance of bibliographic and holdings data is greatly facilitated. But we are also becoming increasingly aware of a gamut of problems that will challenge us as librarians and which will undoubtedly result in significant changes in the ways libraries are used, in some of our basic concepts about cataloging, and in the tradition of autonomy and independence of individual libraries.

Initial development of online catalogs has been concerned with "making it possible." The result has been the development of a variety of online systems and such development continues. The automated circulation systems of the 1970s are evolving into "public access catalogs" providing bibliographic data and sophisticated searching. DataPhase and CLSI are examples of manufacturers of circulation systems that are developing online public access components for those systems. Large libraries and groups of libraries have developed local systems and are beginning to market them. Northwestern University's NOTIS and the VTLS from the Virginia Polytechnic Institute and State University are examples. Bibliographic utilities and networks are marketing online catalogs. OCLC has its LS/2000 and the Southeastern Library Network (SOLINET) has LAMBDA. "Turn-key" systems are available from a variety of sources. Biblio-Technics and GEAC Computers, Inc., are two of many vendors selling systems.

In his 1983 survey of the automated library system marketplace, Joe Matthews listed a number of libraries and vendors that are marketing systems of various configurations.[1] There have been several articles and monographs describing online systems and numerous opportunities to see demonstrations at conferences and meetings. We have seen that the only commonality in these systems is that they are all different. The systems run on micros, minis, and mainframes. Some offer very sophisticated searching and retrieval, others barely provide the services of a card catalog. The way records are searched and what is displayed vary considerably from one system to another. Those of us in the market for an online catalog have many options, not the least of which is to develop our own.

Current Issues and Concerns

Now that online catalogs have passed the initial stage of development, a new phase has begun and we are seeing evidence of it in publications,

reports at conferences, and in research activities. The issues and concerns have broadened from the basic "how-to-do-it" to those centered around making the online catalog more usable and taking advantage of the capabilities of the systems. There is concern about the lack of standardization among systems. This lack of standardization was a boon during the developmental stage because it permitted creativity and flexibility in design. Now, the need is seen for some measure of standardization. There is concern that the capabilities offered by some systems for retrieval of information can be overwhelming. Keyword searches, for example, can retrieve an enormous number of citations that are overwhelming and discouraging to a user. Designers are now focusing on how to make searching, particularly subject access, more feasible.

Authority control is a major issue. The collocating function of traditional library catalogs has been one of their major assets. This function will be lost in an online catalog that lacks authority control. Automating authority control provides a means for ensuring collocation and enabling easier maintenance of the database. Yet, authority control is one of the most expensive functions in cataloging, and providing for this control in an automated catalog is still in the early developmental stages in the majority of existing online catalogs. Many systems have left it out, intending to provide it during a later phase. Related to authority control is subject access, which involves a number of issues. Authority control of subject headings, types of subject access, and the relationship of call numbers and scope notes from classification schedules are examples.

Resource sharing has become a facet of the library profession that will undoubtedly grow as online catalogs are enhanced and improved. Many of us are familiar with the cooperation established through the use of shared cataloging utilities. This concept has branched out to include plans for developing cooperation among utilities and for a national name authority database. Both of these will be beneficial to the development and use of online catalogs in individual libraries. There are several instances of groups of libraries who have jointly developed online catalogs or who have joined a network where one library provides the online system and other libraries contribute records and access the system as a union catalog.

Retrospective conversion is of major concern. It is extremely expensive, especially for large libraries; yet, to be truly effective, online systems will need to include all or most of the cataloging records in a library. Patrons will demand it through their desire to access the library's entire book collection in the online catalog, especially as they become more familiar with the capabilities of the online system. User expectation, not only regarding content of the database but in many other aspects, will be an important factor in the continuing development of our online systems. As technology provides the capabilities for more sophisticated use of online systems, and as staff and patrons become more adept in using these online systems, they will demand that existing systems be enhanced to provide the services of which the more sophisticated systems are capable. Moreover, as technology "rolls over" and changes to the extent that the old equipment and systems become obsolete and must be replaced, we will have to upgrade and replace our systems. This will be an expense that we may

not have anticipated and which is unusual in the library profession. The time period for "roll over" is accelerating. A few years ago, it was seven to ten years; systems designers are now using a five-year period in many instances. We will have to learn to deal with this need and demand.

Integration of systems is an ideal that is reaching fruition in many situations. Broadly defined, an integrated system is one which uses data for a variety of functions. For example, in an online system, one database of bibliographic and holdings data would be used to create files and records for a catalog, a shelflist, a circulation system, serials control, and acquisition processing. Other data would be used with the system such as patron files, accounting data, and authority records. Integration reduces redundancy of files and limits the input of data to a one-time operation. But achieving such a system is expensive and very complex. There have been systems developed that are relatively integrated, but mostly development has been piecemeal, such as beginning with an automated circulation system, enhancing it so that it functions as an online catalog, and adding serials check-in capabilities. In many libraries, the automated systems are not integrated, but are separate, independent systems. Because the need to automate certain functions or activities may be very pressing, we often cannot wait for the luxury of a fully integrated system. Piecemeal development may be the most efficacious process. We can, however, design our systems so that integration or linking of systems is feasible in the future. It is important that we plan carefully for the future, expecially since the accelerating development of technology brings the possibility of totally integrated systems nearer and nearer.

Related to user expectation is the need to carefully educate library staff and users about the capabilities of the systems we make available. This goes beyond teaching them how to use the systems, for it encompasses an understanding of the limitations as well as the capabilities and potentials. We must make them aware of the reasons for the limitations in our systems so that, instead of frustration and disappointment with our libraries and their services, we help them become sophisticated users who are supportive of our endeavors. Not only users must be educated, but those who control the finances of our libraries. We must learn to communicate to them the necessity of taking the financial risk involved in development. They need to understand that stasis will not be reached; rather, the financial commitment will grow. It is the expense, coupled with the great potential of library automation, that will lead to significant changes in our libraries.

Of concern in developing our online systems and providing for user needs, as well as meeting their expectations, is the issue of special interests. There are materials and users that cannot be accommodated well by a general system. Music and archival materials are examples of special materials. The users of those materials have needs not usually associated with general monographs and serials. There are also other users with special needs, in particular the handicapped. If our online catalogs are to be successful, those special needs and interests must be addressed.

Conclusions

The issues and concerns listed above deserve our attention and study. Many of them are being addressed by librarians and others. For example, standards related to online catalog displays are the topic of several standards-making bodies; Council on Library Resources-sponsored research has helped to reveal the potentials and pitfalls of subject access; and education of users has been another focus for research. Those of us involved in online catalog design, implementation, and use, must be aware of these issues, of the activity related to them, and of the consequences of that activity for our profession, for the service we provide to library users, and for the library as an institution. The following chapters discuss these issues in more detail.

References

[1]Matthews, Joseph R., "Competition & Change: The 1983 Automated Library System Marketplace," *Library Journal* 109 (May 1, 1984): 853-860.

PROVIDING FOR SPECIAL INTERESTS

System Design

Although this section deals with special interests, the principles are applicable to general development and planning for online catalogs. Since provision for special interests may easily be overlooked during the initial planning and development phases, it is discussed here in detail, for only if we are careful in our planning can we be certain that all facets of library service are considered and provided for.

When designing, planning, or evaluating an online system, usually the concern is for handling monographs and serials and for serving the general users of those materials. Yet there are many unique types of materials in libraries, such as audiovisual (AV) materials, scores and sound recordings, maps, government documents, manuscripts, and rare books. There are also special collections of materials drawn together for various reasons. Moreover, there are often groups of users who approach the library differently from general users or who have special needs. Handicapped users, browsers, foreign-language speakers, researchers, and first-time library users are examples.

Often, special materials do not fit easily into the mold we have developed for handling ordinary monographs and serials, and just as often, the users of those materials have different needs when searching, accessing, or using the materials. Similarly, the exceptional patron, such as someone who is handicapped or a foreign-language speaker, has special needs that may not ordinarily be provided for. We must be careful to design and build our online systems so that these materials and users are accommodated. Even if there is not the means to provide for them in the first phase of the system, they must be taken into consideration during initial planning so that the system is flexible enough to accommodate them in future enhancements.

Both designers of online systems and the librarians who work with special materials and users have responsibilities for making sure that the online system can handle those materials and provide for the needs of those users. Designers must make an effort to seek information about these materials and users, and must give librarians representing them an opportunity to participate in appropriate phases of design and planning. Similarly, the librarians who work with special materials or types of users must make their needs and suggestions known to the designers and planners. The burden is on the librarian, however, to become an effective advocate so that designers and planners are aware of the special needs and concerns relating to those materials and users. This requires that librarians educate themselves in library automation, broaden their scope of professional involvement beyond their speciality, and develop contacts with designers and planners in their own libraries. Most importantly, they must have a solid concept of what they need and expect. This can be accomplished by participating in a design exercise.

The purpose of the design exercise is to formulate a nontechnical description of the desirable online catalog or system in the context of the specific

materials or group of users. By understanding fully what is needed, the specialist will be able to communicate more effectively with designers, planners, vendors, administrators, and the library community in general. In formulating the description, the first step is to develop a brief definition of the online catalog, particularly enumerating the functions it must perform to serve the user and handle the materials in question. Once the catalog is defined in this context, the next step is to address some of the specific concerns and issues to amplify the description.

Concerns and Issues

The scope and content of the database, for example, is a major concern. Within a given category of material, such as AV, there may be many types. Consideration must be given as to whether all the material or only certain types should be included. The role of retrospective conversion of records that are not in machine-readable form must be taken into account. There may be fields in records that should not be deleted or dropped when records are processed for the system because they are particularly important to the type of material or needs of the users. On the other hand, there may be data that are not now included in machine-readable records that would be particularly useful and that should be added.

Displays are another concern. It is possible that the displays developed for general materials and users are not adequate for conveying information about special materials or for serving the needs of certain types of users. The displays may need to be formatted and organized differently, or may need to include more, less, or different information than general displays.

Search capabilities are an area where special materials present challenges for access and retrievability. Access points in particular should be carefully evaluated. For example, access by agency of production might be very useful for government documents, access by type of binding may be of value for rare books, and access by plate number may be especially crucial for scores. The usual search capabilities may not be particularly useful for certain types of materials. Designers and librarians must evaluate carefully the various kinds of access available, relate them to the way the materials are used and accessed, and determine if special provision must be made for increased access or modification in general search capabilities. The same considerations apply for the special category of user. Perhaps different access points and search capabilities would more appropriately serve the needs of the user.

The type of help and online assistance the system provides may not adequately provide for the problems and needs of special materials or users. Customized assistance may be needed so those users can access the material most effectively. Perhaps the system needs to be designed to provide tutorials for certain types of materials or users, or perhaps different prompts and menus are needed. This consideration closely relates to the issue of search capabilities and access points. As plans are made for providing for searching and access, consideration must be given to whether the particular search mechanisms require special online help, prompts,

or tutorials. First-time users and experienced users have different needs and usually designers and planners take them into consideration. Other special users should also be identified and taken into account. Those who work with materials that retrieve large number of records, such as searches for literature or music, are an example of special users.

For some types of materials, holdings information is especially difficult to organize into a machine-readable form and then display intelligibly to users. Serials and complex sets are examples, as are AV materials, collections of scores and sound recordings, and the types of materials found in manuscript collections. Although the initial system may not be able to handle complex holdings data, provision must be made so that in the future they can be accommodated. Related to providing holdings information is the issue of providing circulation status and also linking bibliographic records with acquisitions records, serials records, and authority records. All of these concerns must be examined.

It is not unusual for librarians who work with special materials or patrons to develop customized files to better control and access the materials or serve their users. Standard cataloging processes are often not able to provide the kind of access or extra information that is needed. Examples are special files for rare books that provide access to types of binding, and the addition of access points to catalog records that AV or music librarians might establish in special files so that large, unanalyzed collections can be accessed. Similarly, information not normally needed for general materials may be added to catalog cards by specialist librarians to give them more manageability and control of the material or to help them serve their users. During the design or evaluation stage, the special files and added information must be considered to determine whether provision is needed in the online system, and if so, how it is to be accomplished. This may directly relate to search capabilities and access points, or it may be something that actually should be part of an acquisitions, circulation, authority, or holdings record.

The issue of authority control must be addressed in the context of special materials. For these materials, authority control may require different or customized treatment. Similarly, search capabilities, access points, and the basic functions the catalog is to perform warrant careful consideration, for instance, whether a collocating function is to be provided and whether the system will be able to process searches where there are variations in the forms of headings used.

A necessary part of the design exercise is to consider some of the issues and concerns that will have to be dealt with when planning is done for actual implementation of the system. Education of the staff and users at various stages during design and implementation phases and provisions for training them to use the system must be taken into account. All of this falls under a general category of "marketing" the system. Those who work with special materials and users must consider whether there are aspects of implementation, education, and training that would be different or extraordinary. Especially if unusual search capabilities or access is provided, customized marketing may be called for. If the system does not accommodate these materials or users well during the initial phase, it might

be wise to provide information about future enhancements that will eventually satisfy their needs more adequately.

Anticipating Change

Any online system will result in numerous and significant changes, especially in work flow, policies and procedures, use of staff, deployment of resources, and service patterns and attitudes. It will also change the expectations and needs of the users as they discover the capabilities (as well as the limitations) of the system. In relation to staff and users of special materials, there may be changes and adjustments very different from those anticipated for other materials. In the design exercise, and later, as the plans for the online system develop, librarians who work with special users and materials should take time to think about the implications of the system so the changes can be anticipated and provisions made for dealing with them.

There are undoubtedly other concerns and issues that must be addressed. Also, as the actual planning process and implementation phases develop, unanticipated issues and concerns will come to light or issues addressed at the outset may need to be reconsidered in view of developments and changes in the initial plans. The design exercise is not the end, therefore, of the librarian's responsibility. It is important to keep up with the evolution of the planning, design, and implementation process so that needs and concerns can be communicated effectively and in a timely manner.

Communicating Special Needs

Since the burden of communicating the needs relating to special materials and users lies with librarians who work with those materials and users, an important function is to become an effective lobbyist for that interest. Formulating a description of the online catalog in the context of the special user or type of materials is a first step. There are other things that should be done. The librarian must gain a basic knowledge of library automation. This will require some effort, but it will be well rewarded in the increased ability to talk and work with designers, planners, and vendors; to keep up with trends and developments; and to understand how needs and concerns can or cannot be accommodated in an online system. Developing the level of competence with library automation that is needed to communicate about special materials or users can be achieved largely by reading articles about automation in the general library literature. Journals and periodicals dealing specifically with library automation are also a must. Another effective means is to become active in general library organizations and in library organizations that deal with automation. Attending American Library Association conferences and going to meetings and programs where library automation is the topic will help in developing knowledge of automation and provide the opportunity to make contacts with people who are knowledgeable in the field and influential in designing and developing online systems. Not only is there the opportunity

to learn, there is the opportunity to educate others about the needs and concerns of the special interest group. This means that specialists must make an effort to broaden their activities beyond the literature and organizations of their specialities.

Within their own institutions, specialists have the opportunity to develop contacts and to establish effective working relationships with those who have influence in the design or implementation process. Whether the library is developing a system in-house or planning to purchase one, it is important for the librarian concerned with a special group or type of material to get to know those who are directly involved in the planning phases as a source of information and to gain a receptive ear for the concerns and needs of that librarian. It is important to learn as much as possible about what is being planned because, the more informed the librarian is, the more effective he or she will be in communicating the concerns in relation to the system under development. Enthusiasm and an open mind for what is being proposed, along with honest attempts to understand the limitations of initial developments, will go far toward giving specialists a welcome reception when expressing their concerns and needs.

Conclusions

Not only should librarians concentrate on educating themselves about automation, making contacts through general organizations, and developing effective contacts within their own libraries, they must educate the general profession about their needs and concerns. This means reaching out through general library literature and the literature of library automation so that a wide audience becomes aware of their concerns. The emphasis must be on enlarging the interest and activities beyond the narrow scope of the speciality so that the requirements of that speciality can be met.

The responsibility of designers, planners, and vendors, must not be forgotten. They must encourage specialists to participate, support them in their efforts to gain confidence in library automation, and seek their advice and opinions. Only by a joint effort will the needs of special interests be accommodated in the online system.

AUTHORITY CONTROL

Current Status of Authority Control

As libraries develop online catalogs, the need for authority control has taken on new importance. Although there is some controversy about whether authority control is necessary in an online environment, the consensus is that it is indispensable. Traditionally, authority control has served the purpose of facilitating the collocating function of the catalog. By using a consistent form for each unique entry or access point, all records relating to that entry can be brought together in one place. Authority work involves determining the form to be used, recording it, and providing information about the form of the heading. For name authority work, the latter includes variant forms of names, related names, and sources used in determining the entry. All of these data are gathered together into a name authority record. Verification of headings is another aspect of authority work in which an entry is checked against existing authority data to determine if it has already been established.

Advantages for Online Catalogs

An online catalog which has adequate authority control has several advantages. Standardized forms of names used as access points permit flexibility in developing search strategies, the collocating function is facilitated, and the possibility of global changes to access points is feasible if the bibliographic and authority records are linked. With linked records, online users can request information using a variant form and the system can automatically display the record without having to direct the user to make another search under the authorized heading. Advantages go beyond the local level, however, for with authority control providing consistency in headings used, accessing other library catalogs, for example, is facilitated so that sharing of bibliographic data among libraries is more effective.

Requirements for a Name Authority File Service

Many libraries have developed their own manual authority control systems, usually relying on the headings established by the Library of Congress as the basis for verification of headings. Authority work is an expensive, time-consuming process, and libraries are looking toward the possibility of sharing the work much as they have sought shared cataloging as a means of reducing the cost of cataloging. With this aim in mind, the Bibliographic Service Development Program of the Council on Library Resources, Inc., formed a task force to plan for a national name authority file service. The task force was composed of representatives from bibliographic utilities, large research libraries, the National Library of Medicine (NLM), and the Library of Congress (LC). In the spring of 1981, the task force issued a report, *Requirements for the Name Authority File Service*, and submitted it to the library community for comment.[1] This

project will have a profound effect on the development of effective online catalogs, on the ability of libraries to afford automated systems, and on the evolution of increased resource sharing among libraries. It deserves our close attention and support and is therefore described in detail.

In its report, the task force outlined the purposes of the Name Authority File Service as: (1) collecting and maintaining authority data for names, titles, and series (topical subjects are not planned for inclusion at the beginning of this service); (2) recording and maintaining the relationship between and among headings; (3) ensuring integrity of headings; and (4) providing query access to the data.

Recognizing the need for standardization if data are to be shared, the task force indicated that the service must be MARC compatible. A determination made prior to the establishment of the task force was that the Research Libraries Group and Research Libraries Information Network (RLG-RLIN) will be responsible for building and maintaining the database. The name authority file of the Library of Congress (LC) will be used to create the initial database, and selected institutions will contribute records. RLG will be responsible for technical maintenance and LC for bibliographic maintenance.

Contributing libraries will be able to add, change, and delete authority records. To ensure integrity of the file and facilitate maintenance, the task force suggested that various criteria be established for each function and that computer editing and validation be a part of the system. For adding records, the system should accept only records in the MARC format containing characters defined in the LC MARC character set. To change or delete a record, certain security requirements were stipulated. See references, see also references, and catalogers' notes may be added by any contributing source at any time. Other additions to a record require that all contributing sources have an opportunity to review and comment upon the proposed addition. Changing or deleting any information in a record except catalogers' notes also requires review as does deleting an entire record.

Such a review by contributing institutions may at first appear to be unwieldy, but the task force has recommended that it be accomplished through the "proposed change cycle," utilizing an online routing or mail service that would alert contributors to records requiring review. If no objection is indicated to the proposed change, it would automatically be made after a specified period of time. If there is any objection, it will be referred to the Library of Congress for conflict resolution.

The task force requires machine editing and quality control mechanisms as an integral part of the system to further ensure the integrity of the file. In particular, machine editing is needed to prevent duplicate records from being added, headings from being changed unless related records are updated, and records from being deleted unless related records are adjusted. Specific types of machine editing are enumerated in the report, such as verifying tagging, checking to determine whether the heading is in the file, and checking for internal consistency in records. Part of the monitoring system would be production of batch reports providing data about system use. It was also recommended that the system have a mechanism for sam-

pling data in the name authority file. One use of such samples would be to monitor records added or changed by contributing institutions.

The add, change, and delete functions described above would be performed only by contributing institutions. The query function would be available to all participants. Recommended query capabilities extend to heading data and nonheading data. Of particular interest is the requirement for a mechanism permitting scheduled batch searching. The search requirements offer a good deal of flexibility, permitting inquiries using right truncation, any word or words in a heading, any right truncated word or words from a heading, and a combination of words and right truncation. Boolean searching capability was also listed as a requirement.

Types of access in the query function are broad: any heading; headings by types; title information; heading by role; and combinations of the above. Nonheading queries would apply to the authority control number, the Library of Congress card number, the chronological coverage code, and other fields.

The Name Authority File Service is viewed not only as an interactive, online, linked system, but it is also seen as providing printed products, COM, and machine-readable products. Requirements for display online and other output specifications are addressed in the report. Systems input specifications are also covered. These include displays for the add, change, and delete functions, and formatted paper work sheets for functions requiring off-terminal work.

Of major importance for maximum sharing of data is the requirement that the system be designed so that it can interface with other systems through computer-to-computer interconnection. Anticipating the potential use and demand, the task force required that the system be designed to accommodate expansion. Performance objectives, such as an average response time of less than two to three seconds for online interactive functions, availability seven days a week, and immediate availability of updated data were specified in the report. Data security requirements were outlined such as restriction of the add, change, and delete functions to authorized contributors, "locking" records when changes are made, and monitoring or restricting certain types of changes.

Current Status and Plans

Progess has been made in implementing the Name Authority File Service. A recent publication by the Council on Library Resources[2] describes in detail the current status and plans. (1) A Name Authority Cooperative (NACO) is now envisioned as the first phase of a Cooperative Data Base Building System (CODABASE). This database will consist of name authority records at first, but eventually it will also contain subject authority records, bibliographic records, and even location records. The Library of Congress is seen as the institution responsible for implementation and planning and will be both the technical and authority manager. The latter encompasses bibliographic policy and concerns related to quality, quantity, standards, and training. Technical management involves providing the computer system and resources. Criteria for selection of participating

libraries and quality control mechanisms have been set up. To advise LC in the operation of NACO, a Name Authority Cooperative Participants Committee (NACPACO) is proposed.

Some parts of NACO are already in place for there are libraries contributing to the building of LC's name authority database. Providing for online interactive access to the file through computer-to-computer links is an important part of the NACO development. When this is accomplished, NACO will be able to expand and develop.

Online Communications Link

Since computer-to-computer interface or link is of crucial importance for the system, this has received recent attention. The Washington Library Network (WLN), the Research Libraries Group (RLG), and the Library of Congress (LC) began in early 1980 the WLN/RLG/LC Linked Systems Project under the sponsorship of the Council on Library Resources. The purpose of the project is to develop an online communications link to provide for intersystem data retrieval and maintenance. It is this link that will support the shared authority file and which is crucial in allowing for libraries to take advantage of resource sharing among different systems. It will enable sharing not only of authority data, but of bibliographic data also, and holds a great deal of potential for affecting library work in the future. Work has been progressing on the implementation of the basic telecommunications link, a first step in the project, and other related activities in linking are under way.

Conclusions

The efforts to develop an online authority file to which all libraries can have access is of great importance if we are to effectively use the potentials of library automation and reap the benefits of sharing resources in such expensive endeavors. It is to our benefit to be actively aware of the progress of the Linked Systems Project and the Name Authority Cooperative and to support their development. Moreover, as we design, develop, and implement automated systems in our own libraries, establishment of authority control must be given careful consideration and it is especially important that we provide for the potential for sharing authority work.

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SUBJECT ACCESS

Interest in Online Subject Access

Subject access in online catalogs has become an important concern for designers and developers. The interest really began when results of the online catalog use study, sponsored by the Council on Library Resources (CLR), showed that more than half of the searches in online catalogs were subject searches.[1] An analysis of the data also showed that the most important factor in user satisfaction with the online catalogs was effective subject searching.[2] Since those revelations, there has been a great deal of discussion about and interest in subject access. There have been a number of articles, and it has been the topic of meetings at conferences. CLR has given emphasis to subject access in its sponsorship of meetings and studies. For example, Carol Mandel of CLR wrote a paper outlining issues and concerns related to subject access[3] and the Council sponsored a meeting in Dublin, Ohio, in January 1982, which was devoted entirely to subject access.[4] Many of the recommendations and concerns brought out during that Dublin meeting will be discussed in this chapter. There is a general recognition that online catalogs provide the opportunity for improving subject access, but there is controversy about how to achieve that improvement. There are major questions about the techniques that are necessary, the relationship of the *Library of Congress Subject Heading List* (LCSH) to improved access, and the obligations to catalog users.

Techniques for Subject Access

There are various techniques for, or kinds of, subject access. In a card catalog, access is through a controlled vocabulary and is word-by-word. This type of access is often called controlled term searching and is considered phrase, structured, or precoordinated searching. It is available in many online catalogs. The user must know the exact subject term when initiating the search, and only the subject fields are searched.

Uncontrolled vocabulary searching is used in systems that offer free-text or keyword searching. The user enters a word and the system searches for an occurrence of that word. Selected fields, such as subjects and titles, or all fields, can be searched. The user does not have to precoordinate his searching by determining the appropriate heading, and there is a greater opportunity to retrieve a large number of records since titles and other fields often contain the same words the user has in mind. However, a disadvantage is that collocation of like subjects is lost, and the number of records retrieved may be overwhelming and often not relevant. In comparison, controlled vocabulary searching offers the advantage of collocation and more precise retrieval.

Much of the controversy about subject access has been centered on which of the two methods is better. Mandel reports that "comparisons of free text searching with controlled vocabulary searching have been applied to a variety of databases and systems and invariably lead to the same con-

clusions: a combination of both is best, with the optimal mix dependent upon the specific features of the database, the system, and the user's requirements."[5] One of the assumptions made at the Dublin meeting was that "the optimum subject search tool is the online public access catalog equipped with sophisticated search capabilities including natural language and controlled vocabulary searches."[6]

Related to keyword searching or free-text searching is a method called rotation that simulates free-text or keyword searching. It is a process that brings significant terms in a subject heading into the leading position. For example, in a subject heading such as HISTORY—PHILOSOPHY, both words could be considered significant; but in regular controlled vocabulary term searching, the significant word would be HISTORY. By rotating the subject to PHILOSOPHY—HISTORY, access to PHILOSOPHY is also provided. Mischo has done work with this concept and it offers possibilities to systems that cannot provide free-text searching.[7]

Using classification schedules is another means of subject access. Hierarchical systems such as the Dewey Decimal Classification, can be used to provide users with the means of broadening and narrowing searches, going from the general to the specific, or vice versa. If classification numbers and terms in the schedules are linked to subject headings, it provides added subject retrieval for users. For example, when a user searches under a subject term, the system could display the records that have that subject term, and it could also display records that have a classification number that is linked to that term (i.e., because it was so described in the schedule). It is also possible to design the system to check classification numbers in records retrieved using a term search, search the database for other records with that classification number, and display those records even though their subject headings did not contain the term input during the search. Cochrane and others have written about classification as a means of subject access and urged designers and developers to give it strong consideration. In particular, Cochrane points out that "projects using the MARC Pilot Project tapes demonstrated that DDC and LCC class numbers, used in conjunction with LCSH and title keywords, could bring recall up to and over 90% when no subject access field could do so well alone."[8] Recognizing the value of using classification as a means of subject access, participants at the Dublin meeting about subject access recommended pursuing this option.[9] Subsequently, the Council on Library Resources (CLR) provided support to enable Forest Press and the OCLC Office of Research to investigate the development and testing of an experimental online catalog in which the Dewey Decimal Classification Schedules and Relative Index were integrated into the system as a user's tool for subject access, browsing, and display.

Providing access to subject authority files is a means of improving access in systems that use controlled vocabulary. This helps users determine broader, narrower, and related terms. Analysis of the CLR study of online public access catalogs shows this to be a desirable feature of online catalogs.[10] Since two of the major problems in subject access are how to broaden and how to limit searches, this technique could be particularly helpful.[11]

Broadening and limiting searches can also be accomplished by using online search techniques developed by reference databases. There are Boolean search operators (and, or, not) and word truncation on title words, words in subject headings, series, title words, contents fields, and classification code fields. Limiting searches by qualifying date of publication, language, or type of material are other techniques, as is qualifying the search to specific fields or sets of fields. Contents notes are a "subject-rich" field to which access can be given by providing for keyword searching of the notes field.[12]

Markey recommends incorporating into online catalogs successful and often-used card catalog searching techniques. For example, patrons frequently use the subject catalog to find the classification number where books are shelved on a topic of interest, and then go directly to the shelves to browse. Markey recommends incorporating this into the online catalog so that it would display an alphabetical list of subject headings in response to a subject search. Displayed with the headings would be the number of books per heading and the classification numbers common to a particular heading.[13] Another method used by searchers in card catalogs is to examine the subject tracings on the catalog cards and broaden the search by looking under other subject headings listed on the cards. As Markey points out, this can be done by the online catalog so that when a record is displayed, the user is prompted to search under those headings. It is also possible for the system to analyze the headings in a record or set of records and suggest to the user additional search terms.[14]

Markey calls attention to other mechanisms used by card catalog searchers that deserve consideration when online systems are designed. Postings, or an indication of the number of records found when the search is processed, are important. In a card catalog, searchers can see the number of cards filed under a heading. Postings in the online catalog serve the same function.[15] Another service that online catalogs need to provide is some way of marking or flagging during a search. Markey reminds us that many catalog users mark places in the catalog drawer, e.g., by using slips of paper to flag a card that looks interesting. Provision for this needs to be made in the online catalog.[16] Other mechanisms are backward and forward browse capability and providing a means to record the subject vocabulary searched.[17]

Other Issues and Concerns

There are other issues or concerns that relate to subject access. One that is being discussed a great deal is enriching records to provide greater subject access. Techniques include adding more subject headings to a record (the average LC record has 1.9 subject headings; 2.138 if literature classes are excluded).[18] Cochrane suggests adding descriptors derived from words in the table of contents or indexes of the books.[19] Other suggestions along this line have been to add descriptors from special subject thesauri and use subject headings from more than one system (e.g., use LCSH and NLM).[20] These kinds of enhancements are not without significant costs, however. Cochrane found that augmenting records with terms taken from

the table of contents and body of the work doubles the length of the MARC record and adds twelve minutes of additional cataloging time.[21] At the Dublin meeting, participants acknowledged the value of enhancing records in various ways but cautioned that "enhancements should be pursued only after assessing the cost/benefit to be expected from such enhancements."[22] Library of Congress Subject Headings (LCSH) has often been the focus of criticism in the past. With the development of online catalogs, it is once again facing criticism and is an issue of concern. It appears that LCSH will be an integral part of online catalogs, for as Mandel reports, "a controlled vocabulary is likely to remain an essential component of library subject access for some time to come," and indications are that LCSH will be the controlled vocabulary used by most American libraries as long as these terms are provided on LC MARC records.[23] This was one of the assumptions underlying the Dublin meeting on subject access.[24] The preeminence of LCSH leads to problems for online catalogs. The use of a controlled vocabulary requires an authority file, and in online systems, it is more effective if the file is online and linked to the bibliographic records. Since LCSH is not available in a timely machine-readable form, its use as an authority file in current online catalogs is prohibited. At the Dublin meeting, one of the strongest recommendations was to "create and distribute in machine-readable form the Library of Congress Subject Headings (LCSH) in the LC-MARC authority format providing for current and regular updates."[25]

There are other problems with LCSH. Cochrane states that the cross reference structure of LCSH and the use of free-floating subdivisions seem to be recognized at the outset as two areas where LCSH will have to change to be most useful in the online catalog environment.[26] In her report to CLR, Mandel recommended that LCSH be reconfigured into an online thesaurus that could be searched by catalog users. This would require "restructuring the terms in LCSH into a fully hierarchical arrangement or thoroughly revising the cross-reference structure to bring it up to current thesaurus construction."[27] This recommendation was made at the Dublin meeting.[28] Other recommendations relating to LCSH at that meeting were: develop a way to preserve the provenance of each entry in machine readable LCSH, eliminate obsolete terminology and heading style from LCSH, assess the impact of imposing consistency of form and language in LCSH, and develop a strategy for integrating LCSH and other thesauri.[29]

Related to LCSH but applying to any controlled vocabulary is the issue of entry vocabulary, i.e., the terms a searcher brings to the catalog, which may or may not match the terms in the controlled vocabulary. Mandel states that "the 50% 'hit rate' for terms used by the reader is, prima facie, evidence that the entry vocabulary of library catalogs is inadequate. In other words, the natural language that expresses readers' requests is not mapped, either through cross references or sufficiently convenient displays in the thesaurus used, to the terms appearing in the library catalog."[30] She maintains that although a rich entry vocabulary is expensive, it is worth the cost because of the advantages for the user and for the library staff, particularly catalogers.[31]

At the Dublin meeting, a recommendation was made that a mechanism be established for libraries to suggest see references for inclusion in LCSH and also for other libraries to contribute new headings to LCSH.[32] Both recommendations have been implemented to some extent by LC. Cochrane developed an LCSH entry-level vocabulary project in March 1982, the purpose of which was to establish a mechanism for new entry vocabulary to be suggested and considered for LCSH. Several libraries participated in the project, and by its termination in October 1982, its objective was achieved. Currently the libraries initially involved are continuing to send suggestions for see references to LC.[33] Also, LC has agreed to a cooperative project with three organizations (U.S. Government Printing Office, Harvard University, and the University of Chicago) in which they may contribute to LCSH.[34]

More important than providing a rich entry-level vocabulary is the need to link entry terms with corresponding controlled terminology. OCLC found during its study of online catalog use that "there is a real need for a link between the controlled vocabularies and common terms, although the work will be costly. . . . Without appropriate links, patrons will likely try one or two combinations and, assuming the library has nothing to satisfy their needs, discontinue the search."[35] OCLC found that "patrons prefer the cross-reference structure to be visible,"[37] although others at the Dublin meeting felt that users should not have to distinguish between controlled and uncontrolled vocabulary and that the transition should be transparent.[37] Again, all of the issues relating to vocabulary come back to the basic need for an online subject authority file. Until such a file is readily available to libraries, the enhancements to subject access that involve terminology cannot be implemented.

User Interface

No matter how sophisticated subject access may be, it will be of little use if the searcher is faced with having to learn how to operate a complex system. To paraphrase Markey, an online public access catalog enhanced with features not previously available to library catalog searchers may have more potential than the traditional catalog, but only the inclusion of a user-oriented interface actually makes the online catalog more powerful than the card catalog.[38] As we design and develop improved subject-access mechanisms for our online catalog, we must keep in mind our obligation to the users and make our systems as easy to use as possible.

Related to the issue of user interface is that is standards. Mandel recommends that we develop and promote standards for the user interface in the online library catalog.[39] "Libraries have a unique opportunity, right now, to standardize command language, search procedures, and other elements of the user interface for public catalogs before independent systems proliferate."[40] Although there has not previously been a strong interest on the part of systems designers in developing standards, there is growing recognition of its importance.

Research Needs

The importance of research into subject access has been emphasized again and again by the various groups that have met to discuss subject access and by most of the writers dealing with the topic. Mandel emphasizes that online catalogs present a unique opportunity for providing information about catalog use because the online catalog itself is able to monitor the way the catalog is used. It can, for example, gather data about subject terms used and the success or failure rate of searches.[41] Use of transaction logs to acquire data about online catalog use was recommended by the participants at the Dublin meeting.[42] Other areas recommended for research are evaluating the cost of enriching records to determine whether it is cost-effective, and exploring the feasibility of enhancing the current method of subject analysis to determine whether there are ways to make LCSH more usable in the online environment.[43]

Conclusions

Subject access is a complex and yet extremely important facet of online catalog development. There are significant problems to be faced both in terms of trying to preserve what is good about card catalog subject access, and in determining what is the best way to provide for subject access in the online environment. Undoubtedly we will be reading and hearing a great deal about the issues described above and other concerns as we become more involved in online catalog development and use.

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RETROSPECTIVE CONVERSION

Issues and Concerns

Retrospective conversion (recon) could be one of the main factors contributing to the success or failure of our online catalogs. Not long ago it was an issue of great importance, for as libraries developed online circulation systems, there was a need to build databases of information about the library's holdings. Recon, i.e., data conversion of catalog records from cards to a form that could be used in the online circulation systems, became necessary. This concern generated articles, workshops, and conference programs. It is again an issue that demands our attention and we see evidence of its importance in the literature and in increased professional activities. This time, recon is a more complex issue which has the potential to change significantly our concepts of cataloging and standards and to affect the way we use the catalog as a bibliographic and finding tool. As we become more automated, as we come closer to systems that integrate various library functions, and especially as we move toward online catalogs, data conversion takes on greater significance. We see the value and the necessity of having one database that will serve various functions. Moreover, we see the need to create that database not only to satisfy our current needs, but also for the potential offered in the future as technology develops and improves.

Our vision is broader and more farsighted than in the past, but we are no richer Recon is expensive and very complicated. There are no shortcuts or easy solutions to the problems of expense and complexity, yet if we are to truly take advantage of automation, it seems that we must convert our cataloging records. We will find that our users demand it, while at the same time they require that we increase our purchase of new materials, maintain currency of the cataloging of new materials, and update our hardware and software to keep up with developing technology. We are faced with a real dilemma, not only in our individual libraries as we approach retrospective conversion, but as a profession as we attempt to balance fiscal realities with our professional desires for libraries to provide optimum service.

We need to be wary of this particular issue and not let ourselves be swept into the rush to convert records without carefully studying the issue. We must give retrospective conversion the long-term concern and regard it deserves.

Implications

There are two levels of pertinence: the local level and the broader level. On the local level, libraries considering data conversion, for whatever reason, must embark on a thorough, systematic process of determining the product desired and then planning for it. Fortunately there is now a great deal in the literature about recon, and because many libraries have converted or are in the process of converting, there is experience from

which we can profit. Since conversion is a current topic of interest, there are workshops, programs, and discussion groups in state, regional, and national organizations. Thus, libraries facing the need to convert data can find help from many sources.

Beyond the concerns of individual libraries as they convert data, there are broader implications, for conversion has the potential to generate significant changes in some of our long-held concepts. For example, much of our cataloging reflects a policy of providing very detailed and complete bibliographic information about the item cataloged. We do this without exception. Relatively ephemeral material, when cataloged, generally will receive the same degree of cataloging as a substantive monograph. Conversion may force us to review this approach. One of the issues that an individual library must face when planning for data conversion is defining the record that will be the product of that conversion. Choices range from very brief to full MARC records. Expediency and cost may force a library to accept less than complete records. This has local implications because future and even current use may be limited by a less-than-complete record, but it also has national implications. If enough libraries turn to partial records, or minimal records, sharing of cataloging information will be adversely affected unless a standard for partial or minimal level records is fully accepted and used. In shared databases, acceptance of a standard is only one need. Another is for a mechanism to upgrade the minimal record tc full level. There is already some discussion about minimal-level cataloging and some of the bibliographic utilities, such as OCLC, are working toward a mechanism to upgrade or enhance minimal-level records in their databases. These issues deserve more attention than we as a profession are giving them.

There has been discussion about cooperative efforts in retrospective conversion so that redundancy of conversion can be eliminated and costs reduced, and along this line efforts have focused around the possibilities of building a national database or linking databases so that libraries can access them when converting records. Although such facilities would greatly assist libraries in conversion activities, the problems of standards, uniformity, and compatibility of records would have to be faced and successfully dealt with. Cost of conversion to meet standards acceptable for a shared database might be prohibitive for many libraries, particularly the larger research libraries. A coordinated, cooperative program providing some measure of financial assistance would seem ideal. The Council on Library Resources (CLR) recently published a study of retrospective conversion in which this concept and others related to cooperative retrospective conversion efforts are discussed.[1] The report points out that it may be too late to develop a national strategy for conversion, but nevertheless, it behooves us to give it consideration and support.

Conversion, or the lack of it, will have profound effects on our concept of the catalog as a library tool and our use of that tool. Now, the catalog (usually in card form) is enshrined as the major bibliographic and finding tool in the library. It usually has full-level cataloging records, may have some measure of authority control so that it serves the function of collocating material, and it conforms to a basic format which is standard

in most libraries. In the past there was usually only one place to look, one catalog. AACR2 and the development of computer output microfilm (COM) and online catalogs have changed that, and now it is not unusual for the catalog to be split into two or more formats. Data conversion and the development of an online catalog offer the opportunity to reunite all records into one type or form of catalog, but the price is enormous, especially for libraries with large collections. Unless complete conversion is accomplished, however, our concept of the catalog as a single, comprehensive finding and bibliographic tool will have to change. Even if we do convert our records, if we opt for minimal records we will find the catalog significantly changed; and our use of it, and the way we teach our library users about it, will have to change. Instead of making it easier to access library materials, lack of data conversion or partial conversion may result in complicating the use of the library.

As our library users, both staff and patrons, become accustomed to automated systems, they will demand more, and one of those demands will be for data conversion so that all records are in one catalog—the online catalog. This demand may expand beyond our current concept of what should be included in a catalog. Users may not only require that all cataloging records be converted to the automated system, but that other material not previously part of the catalog be added. Already there have been expressions of interest in having citations to journal articles included in the library catalog. In determining our needs for data conversion, we must be aware not only of our perceived current needs but of the needs and demands of the future. What seems too expensive now may not be when compared to the demands of future patrons or the cost of updating data that was minimally converted.

Conversion of data is becoming a big business, and this has the potential to affect our professional responsibilities regarding data conversion and the databases we are building. The number of data conversion companies seeking library clients has grown considerably in the last few years. We can expect this growth to continue as long as data conversion is perceived as a necessary ingredient of automation, and we can expect these companies or vendors to work to convince us of the need for data conversion and to attempt to influence our concepts of what is appropriate in the process. If we are not careful, the market place may end up defining some of our cataloging and conversion standards. Librarians have the responsibility to inform themselves, consider all options, and have a definite understanding of why they are converting and for what purpose, so that they—not the vendor—define the conversion requirements and process.

Technological Advancement

Libraries are not the only organizations concerned with data conversion. Any business, institution, or organization that automates processes involving record keeping faces data conversion. Because of this we can expect to see technological advances in data input that may eventually lead to devices that can read catalog cards and convert the data automatically with little or no human intervention. Already advances are being made

in this direction with the Kurzweil Data Entry Machine, computer input microfilm devices, and improvements in optical character recognition mechanisms. Coupled with this type of input is the automatic format recognition process that codes the data into the MARC format. Because of the variations in format, type font, and conventions of spacing and punctuation on library card catalog records, none of the scanning mechanisms is satisfactory at present, nor is automatic format recognition entirely satisfactory; yet there is optimism for future effective use. This is not to suggest that data conversion should be postponed until there are less expensive or less time-consuming ways to do it, but to remind librarians considering retrospective or data conversion that not only are there options available now, but also that possibly in the future data conversion may be easier and much less expensive. Part of planning for data conversion might be to view it as a long-term process: (1) convert selected records, known to be of high use, as a short-term, crash project; (2) target others for an ongoing, less intensive conversion effort; and (3) identify records that can wait for future consideration when technological advancements may make conversion more practical.

Conclusions

We have recognized that online catalogs and their extension into integrated library systems will result in major changes in libraries and librarianship. Of all the issues and concerns related to automation, that of data conversion may prove to be one of the most significant in its impact. Because of this, we must look beyond our individual concerns about conversion in our own libraries toward the implications of our actions in shaping the evolution of cataloging, standards, and the catalog itself, as well as toward concerted efforts at cooperative activities.

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RESOURCE SHARING

Trends in Resource Sharing

In order to deal with economic realities and fulfill the obligations to their users, libraries will become increasingly dependent on resource sharing. It has been a facet of librarianship for a number of years, but on the whole, it has been of a kind that did not require significant changes or compromises by the individual libraries. An early example is cooperation in collection development activities. Interlibrary loan is an example of well-established cooperative sharing of resources. Neither of these types of resource sharing required the library to adhere to methods or policies that were drastic departures from tradition. With the advent of automated cataloging activities through bibliographic utilities, there has been a major change in resource sharing. Libraries found automated cataloging cost effective and, in most cases, an absolute necessity for maintaining an acceptable level of productivity, but there were other costs. Traditional policies and procedures often had to be changed to meet the requirements of the utilities. Standards had to be followed and unique practices given up because they were inconsistent with national or regional requirements, or because the system used was not capable of supporting them. It has not been easy for libraries to make the adjustments, and often the standards and requirements are not kept in good faith simply because the library cannot bring itself to make the adjustment and give up that level of autonomy.

Further evolution toward automation will demand even more that libraries adhere to common practices, change time-honored procedures, and develop new policies regarding products and services provided. Two factors will be of importance in this: economic reality and user demand. Economic reality will force libraries to make the compromises necessary to participate in resource sharing. Online systems are expensive, will continue to be so, and yet will become necessities, especially for the larger, complex libraries. One way to meet the costs will be to increase involvement in the sharing of library functions such as cataloging, authority control, and retrospective conversion. User demand for access to materials in other libraries through automated systems will undoubtedly accelerate. To participate in this level of resource sharing, libraries will have to follow common practices and standards and will not be able to perpetuate individual idiosyncrasies.

Issues and Concerns

The economic realities relating to several factors will be the first to nudge libraries toward greater reliance on resource sharing. Creation of the database is one of those factors. Conversion of records to machine-readable form is important for the viability and usability of an online catalog and circulation system, yet it is enormously expensive. Libraries have already begun to seek ways to avoid redundancy in conversion

through cooperative projects, but this raises issues described earlier such as developing standards for converted records and use of minimal level cataloging. To some extent, standardization of cataloging has been an issue with shared cataloging all along, but the economic pressures for retrospective conversion are greater and will make it difficult for libraries to adhere to those standards. There will be even greater temptations to erode the standard for the sake of expediency, but unfortunately this has the effect of making the work contributed to a shared database less useful for others.

Providing for authority control is another expensive, but vital, aspect of online catalogs. The projected Name Authority Cooperative will help in this, but it will require cooperation from libraries in yet another function for which libraries have always been sovereign. Effective use will mean following standards in contributing to the database and also in accepting records from the database without significant changes, since part of the purpose of the national file will be to provide consistency of headings among databases of bibliographic records.

The need for consistency will become more important as we evolve toward linking of bibliographic utilities and individual online systems. Currently many libraries use the bibliographic utilities as a basis for creating their cataloging records, and in doing so make significant changes to headings and other data. Inconsistency in headings and the other data results, but up to now this has not been a problem since the databases created by individual libraries were used only within the libraries and consistency could be imposed as needed within the library. It has meant that use of bibliographic utilities was not as cost effective as it could have been had records been accepted without changes, but the nature of some of the databases precluded doing this, since in some cases there may be little or no consistency in the database offered by the utility. Resource sharing on the level of interconnection of bibliographic utilities and individual databases will require that when we contribute records to a shared database, strict standards are followed, and that when we use records in a database, records be accepted as is so that resource sharing is possible. Otherwise, the inconsistencies in the headings will hamper exchange of data among the different systems.

Related to this level of resource sharing is the type of cooperative venture that is becoming more common as libraries seek ways to make automation affordable. Groups of libraries are joining together to develop online systems. Groups of libraries are joining together to develop online systems. Some share the hardware and software but maintain separate databases. Other have shared databases. An example of cooperative development is LCS (Library Computer System) at the University of Illinois, which provides for the libraries located at Urbana-Champaign as well as a number of others, including public libraries, throughout the state. Another example is the Triangle Research Libraries network in which Duke University, the University of North Carolina at Chapel Hill, and the North Carolina State University are cooperatively developing an online system which will link the three institutions. This kind of cooperation opens entirely new realms of experience for libraries in learning to work together, making compromises, and enlarging their vision to broader perspectives

and needs. Undoubtedly this will continue and be part of the larger trend that will see less adherence to local practices and policies as libraries seek the advantages of resource sharing.

Another aspect of sharing resources is capitalizing on the ability to transmit and exchange data. This can be extended to increased potential for interlibrary loan activities, for transmission between libraries and vendors for acquisitions activities, and for exchange among libraries of statistical and administrative reports. Economic realities, user demand, and convenience will be strong incentives to adapt to the needs and changes that resource sharing will demand.

In considering support of resource sharing, libraries will have to weigh the probability of higher initial costs for benefits of the future. For example, when doing retrospective conversion, it may be most cost effective for the library to create records that are not full standard, MARC level. Yet, the offset in costs for that individual library transfer into increased costs for other libraries, which will want access to those records either through a shared database or by a future communications link with that library's database. Moreover, the minimal records may become a liability for the library in the future when their usefulness is limited and the library is faced with the cost of having to upgrade them.

Conclusions

Resource sharing will undoubtedly become more and more a necessity as we attempt to face the cost of library automation and user demand. Paradoxically, in the beginning, providing for resource sharing may drive up some of the costs of automation. In planning and designing our systems, we must carefully weigh the advantages and disadvantages of involving ourselves in resource sharing or making provision for it, and as with many aspects of library automation, we must consider the future as well as the present.

STANDARDS

Current Status

Standards are among the most important issues in the development of online catalogs and systems. As we evolve toward more sophisticated systems, more sharing of resources, and more need for fiscal responsibility, standards will take on greater and greater importance. We must begin now to give them the attention they deserve.

Standards have been an important, if somewhat unobtrusive, part of library work for a number of years. The 3x5 catalog card is an example of a standard that we have all become familiar with. The standard library typewriter keyboard is another. Adopting these standards led to products that made our work easier. Imagine the difficulty in purchasing cards, catalog trays and cabinets, replacement parts, and so forth, if we had not had a standard size for catalog cards.

Another standard that has been around for a number of years is the set of rules used for cataloging materials. These rules have been through several editions and the most recent has been indicative of our changing relationship with library standards. Early library standards were largely related to products that facilitated library work. Rarely did they require that we change our practices. If they did, we usually ignored them or made adjustments. Local interpretations of the early cataloging codes are examples. As we have become more interdependent and involved with resource sharing, adherence to standards that deal with processes have become important and often imperative. This affects our local practices and policies and we have found that adhering to a standard sometimes means having to compromise or significantly change well established attitudes and practices. ISBD, AACR2, the MARC formats, the bibliographic input standards of our various utilities, and rule interpretations by the Library of Congress (LC) are examples of standards that have led to advantages for libraries that followed them, but which also contributed to increased difficulty and complexity in some of the activities associated with them.

Standards for Automated Systems

As we evolve toward online, automated systems, we are finding that standards are becoming vital. The costs involved in automated systems, the expediency of sharing resources, and the inevitable need to periodically update hardware and software as technology advances, demand a level of compatibility and consistency that we can have only by developing and adopting standards for our processes and equipment. No longer can we ignore a standard because it doesn't suit our needs; now we have responsibilities beyond our individual concerns and immediate needs. Moreover, there are no longer only a few standards with which to be concerned. Library automation involves a broad spectrum of standards, many of which are developed in fields outside librarianship. For example, there

are standards dealing with the hardware used by libraries in their automated systems, with the software that supports those systems, and with the communications facilities that link them. Most of the standards for those functions were developed by the data processing community. In order to effectively plan and design our automated systems, we need to be knowledgeable about those standards and their relevance to the systems we are designing.

Within the library community, standards activity is increasing and there is greater emphasis on international standardization. The majority of standards activity in relation to automated systems has been to standardize the formatting of data so that the sharing of it is facilitated. Recent developmental work on a format for storing and communicating holding information is an example. Activity is widening in scope, however, for online catalog development is demanding even more standardization. For example, we are beginning to realize that our users may demand consistency and compatibility similar to that provided by a card catalog. With the card catalog there is standardization of the size and format of catalog cards and general consistency in filing rules and methods of accessing the catalogs. Catalog users have been able to go from one library to another and, with little orientation or adjustment, transfer skills and experience gained from using the catalog in their local library to using the catalog in other libraries. This is not the case with online catalogs. Users must learn new command languages for each system, deal with a limitless variety of formats and displays of information, learn specialized accessing techniques, and even orient themselves to a wide variety of keyboards and terminals. We are making access more sophisticated and easier in many ways, but at the same time we are making it more complex and are somewhat limiting the independence of the library user. There is interest now in developing standards to facilitate use of online catalogs, and we will be seeing activity in developing a standard command language and standard displays.

It is important to remember that, although standards can enhance library activities by providing a consistency that permits, among other things, sharing of resources, ease of use, and interchangeability of hardware and software, there is also the possibility that standards may inhibit creativity and developmental activity by discouraging experimentation and exploration. There is a fine line between standardizing and allowing for flexibility, and we must be careful in our development and adoption of standards to provide for both. At the same time, librarians must achieve a firmer sense of responsibility in relation to adoption of standards. We must be more discriminating in our penchant for interpreting standards to fit our local needs and practices. Too much interpretation or adjustment of standards in local application leads to a weakened and eventually useless standard. To gain full advantage, librarians may be faced with the necessity of following practices and policies that at one time would have seemed unacceptable.

Conclusions

There are a number of things we can do to optimize our growing relationship to standards. We can begin by learning about the various kinds of standards, standard-making activities, and the organizations involved. A good place to start is by reading the articles in the Fall 1982 issue of *Library Trends*, which is devoted to library standards. One of the most important and active standards-making organizations in librarianship is the National Information Standards Organization (Z39), referred to as NISO. The newsletter published by NISO is free and is a good source of information about library standards. Another standards-making body of particular concern to library automation is Subcommittee X3 (Information Processing Systems) of ANSI. X3 does not publish a newsletter, but information about its activities is reported at the TESLA committee meetings at ALA and is published by LITA in its newsletter. The *LITA Newsletter* also has a regular column about standards called "Standard Fare." The *RTSD Newsletter* is another good source for standards information through the column about standards written by Sally McCallum.

Reading about standards will not be enough; we must become actively involved in developing the standards, updating them as needed, and adopting them in our libraries. This means volunteering our services to NISO and other standards-making organizations. It means active participation when standards come up for review and comment. We must study them, make our comments, and discuss them with colleagues. It means, too, that libraries as organizations will have to lend support by providing for staff to participate in standards-making activities, by supporting the standards as institutional policy, and by lending financial support to standards-making organizations. Furthermore, there is the challenge for all of us to recognize that we must make adjustments in our own individual preferences and local needs so that we can take advantage of the positive applications that standardization will offer.

EDUCATION

The Librarian's Role

Traditionally libraries have been an important part of the educational system. They have served as depositories and caretakers of information resources. Librarians have seen their role as not only caretakers but as organizers of the collection of information so that it can be accessed and used effectively. As part of this role they have been teachers, providing instruction in how to use the library and its resources. This aspect of education has expanded in recent years to encompass an outreach concept of making the public more aware of the resources of the library and how it can serve them. With this concept of outreach has come a greater emphasis on the need for improving public relations so that support of libraries is increased and assured.

Issues and Concerns

Automation of library activities will expand this role and change it. Librarians will be called upon to teach people how to use the online catalog in the same way that they have had to teach them to use the card catalog. In educating users about the resources of the library, providing information about the online system will be a major topic. But online systems have an advantage over the card system in that the system itself can teach users how to use it and can help them when they have problems. Some systems are being designed so that if a user has a problem with a search, after a certain number of times the system will automatically notify the user that he needs help and prompt him through the correct procedure. No longer will the catalog be a passive tool; rather, it will interact with its users in much the same way that staff have interacted with patrons in the past. This is not to say that librarian assistance will become obsolete, but it will subtly change the role of the librarian by emphasizing the need for care in the design of the systems so that user needs and problems can be anticipated. It will also necessitate that we study carefully how the catalog is used and what is needed. It will be quite different from the card catalog and the assumptions we have made about user relationships with the card catalog may no longer be valid.

Needs and problems of the user are not the only concern. The more people are exposed to automation, whether through libraries or in other experiences, the more they will know about using computerized systems and their potentials. Their expectations will be raised, possibly beyond the ability of the library to respond. Library automation, by its very complexity and expense, will undoubtedly lag behind automation of other functions and activities in our lives. Part of the education of our users will involve dealing with their expectations in relation to what the library is able to offer. If we do not face this issue successfully, users will be angry, frustrated, and disappointed in our libraries and a firm basis of our support may well be eroded. This may be particularly true of academic libraries

where faculty and student pressure for implementation of the latest technology could strain the resources of the library. As an example, the pressure of users to have all records online so as to have to look in only one catalog can be quite strong, but the expense of converting those records may be such that the library cannot afford to provide such a service. How to convey this to users will be important if the library is to maintain their good will.

Another aspect of education involves administrators who have the ultimate decision making power and who control finances. The expense of automation, in staff time as well as in dollars, may lead to fiscal conservatism on the part of adminstrators at a time when their support is most crucial. This has happened already in some of the larger research libraries where development has slowed considerably because financial backing was not available. Particularly when the finances are controlled outside the library, it is important that the library take the initiative in involving those with financial responsibility to an extent that their support is assured. This is pushing libraries into a role that is somewhat different from the traditional one. Our administrators have always had to justify expenses for books and staff, but justifying expenses for a product that is still new to libraries, that is very expensive, and that is developmental is an entirely different situation and new skills and abilities will be needed for that task.

Perhaps the most important consideration in education is communication. During the developmental stage (or the negotiation stage if the system is being purchased), there is often little communication between the designers and staff and users. Time pressures, the problem of educating people about the technology and interrelationships, and the need for some discretion relating to financial arrangements make attention to communication difficult. As a result, the online system is a mystery to many and is often seen as something absorbing a great deal of money and possibly threatening time-honored traditions within the library. It is important that the tendency to ignore the communication and educational aspects be avoided. Libraries that have been successful in generating the enthusiasm of staff, users, and administrators for their online systems are those who have given a great deal of attention to involving a number of people in the development stages, to providing frequent and timely reports on happenings and developments, and to providing many opportunities for people to learn about and be aware of what was going on. This kind of attention to communication and education adds to the development time-frame and the cost, but in the long run, the system is better received and supported.

Conclusions

Educating our users and staff and communicating about library automation will give us new challenges. Our ability to successfully meet those challenges will be a determining factor in the success or failure of the implementation of our automated library systems.

Conclusion

Challenges to the Profession

In discussing the various issues and concerns related to the development of online systems and, in particular, online catalogs, it becomes evident that librarians are, and will continue to be, faced with challenges and changes that will profoundly affect the organization of our libraries and the services provided. The profession, too, will change. It is imperative that we be aware of the issues and concerns, that we address them, and that we develop and maintain a positive and optimistic attitude about the challenges and changes so that we can successfully guide our libraries and our users through this automation age. Each of the issues and concerns offers its own special challenges and places unique demands on the profession.

Retrospective conversion, for example, raises a number of questions about the databases that will be the foundation of our automated systems. We may have to change our concepts of what is appropriate for inclusion in catalog records, how complete our databases can be, and what level of service can be provided.

Resource sharing and cooperative efforts will undoubtedly become a necessity as we face the expense of developing and maintaining automated systems and their databases. The traditional autonomy and independence of libraries will be challenged as librarians are required to forego individual practices in exchange for the advantages offered through cooperative ventures. Our reliance on and acceptance of standards will become greater since this will facilitate resource sharing.

We will be encouraged and even required to examine and study various issues more thoroughly than we might have in the past. The expense of automation requires that the decisions we make about it be based on sound evidence. Thus, we will see more research related to online catalogs. Providing for subject access is one topic that already is, and will continue to be, the focus of research. In the past we created our catalogs and catalog records based largely on assumptions made about user needs, patterns of use, and the physical limitations of the catalog. Research was done, but it was often used to support existing practices. The online catalog will necessitate that assumptions be verified with careful research. Librarianship will undoubtedly gain from this requirement, and we will find ourselves developing more professionalism in our research endeavors as we grow to meet this need.

The impetus for much of this change and the basis for the challenges presented by library automation is not so much automation itself as it is the economic reality surrounding it. Library automation is enormously expensive and will continue to be so, yet it is becoming a necessity as a means to control information about the collections in our libraries and to provide that information to our users. We are faced with initial hardware and software expenses, with the costs involved in building and maintaining the database, and with meeting the expenses of updating our

systems as they become obsolete and as there is new technology of which to take advantage. User expectation and rising needs will be factors in influencing us to continually upgrade our systems. We will have to learn to garner the economic support needed and to balance it with other demands. We will have to provide for the continual training of librarians so they can keep up with the changes and advancements in technology, not only so they can provide assistance to patrons using the system, but so they can knowledgeably participate in the design, evaluation, and upgrading of our systems. These economic realities will be the main focus of change for our profession and are the focal point around which successful implementation of library automation revolves.

Facing the Challenges

Our responsibilities as librarians facing the challenge of library automation are significant. We must educate ourselves and make the effort to participate in the design and development of our systems so that the product achieved is useful for libraries and their users. Awareness of the issues and concerns so they can be appropriately and adequately addressed during the development and enhancement stages is essential. It is imperative that we concern ourselves with cost and recognize that it is a factor that must be taken into consideration when making plans about our systems. Openness to resource sharing and the sacrifices it entails will become important factors. And mostly, we must foster a willingness to face the inevitable changes that library automation will bring, and to preserve a steadfast faith that eventually library automation will indeed enable us to provide more satisfactory service to the users of our libraries.

ACRONYMS

AACR2	*Anglo American Cataloging Rules*, 2nd edition
ALA	American Library Association
ANSI	American National Standards Institute
ARL	Association of Research Libraries
CLR	Council on Library Resources
CODABASE	Cooperative Data Base Building System
COM	Computer Output Microfilm
ISBD	International Standard Bibliographic Description
LC	Library of Congress
LCS	Library Computer System (University of Illinois)
LCSH	Library of Congress Subject Headings
LITA	Library and Information Technology Association (ALA)
MARC	Machine Readable Catalog
NACO	Name Authority Cooperative
NACPACO	Name Authority Cooperative Participants Committee (proposed)
NISO	National Information Standards Organization (Z39)
NLM	National Library of Medicine
OCLC	Online Computer Library Center
RLG	Research Libraries Group
RTSD	Resources and Technical Services Division (ALA)
TESLA	Technical Standards for Library Automation (ALA)
WLN	Washington Library Network

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